

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 20 AUG 2004

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Applicant's or agent's file reference BPX 9924	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/04785	International filing date (day/month/year) 05.11.2003	Priority date (day/month/year) 15.11.2002
International Patent Classification (IPC) or both national classification and IPC E21B29/06		
Applicant ETUDES & PRODUCTIONS SCHLUMBERGER		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 21.04.2004	Date of completion of this report 23.08.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Schouten, A Telephone No. +31 70 340-4088 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/04785**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-12 as originally filed

Claims, Numbers

1-21 received on 30.07.2004 with letter of 28.07.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
 - ☐ the language of publication of the international application (under Rule 48.3(b)).
 - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority in written form.
 - ☐ furnished subsequently to this Authority in computer readable form.
 - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
4. The amendments have resulted in the cancellation of:
- ☐ the description, pages:
 - ☐ the claims, Nos.:
 - ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
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International application No. **PCT/GB 03/04785**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-21
	No: Claims	
Inventive step (IS)	Yes: Claims	1-21
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-21
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:

D1: WO 96 04457 A

The document D1 is regarded as being the closest prior art to the subject-matter of independent method claim 1 discloses on page 6, line 11-34; page 7, line 26-33; page 8, line 3-4 and in Fig.1 (the references in parentheses applying to this document):

A method of cutting through a tubular (5) of a wellbore (3) at a selected location in the wellbore (3) using a remotely controlled electrically powered cutting tool (10) that comprises

- (a) a tool body (11),
- (b) a cutting head (15) provided with a cutting means (24, 25), the cutting head (15) being pivotally mounted on the tool body (11) at or near the lower end thereof,
- (c) an electrically actuatable means for pivoting the cutting head (15), and
- (d) a biasing means,

the method comprising the steps of:

- passing the cutting tool (10) to the selected location in the wellbore (3) with the longitudinal axis of the cutting head (15) aligned with the longitudinal axis of the tool body (11);
- electrically actuating the pivoting means to pivot the cutting head (15) with respect to the tool body (11) to a position where the cutting means (24, 25) of the cutting head (15) is adjacent the wall of the tubular (5);
- actuating the biasing means to urge the cutting means (24, 25) of the cutting head (15) against the wall of the tubular (5), and
- actuating the cutting means (24, 25) to cut through the tubular (5) of the wellbore (3).

The subject-matter of claim 1 differs from this known pipe cutting tool in that the biasing means is an elongate arm that is an extension of the cutting head, said arm being moveable between a retracted position where said elongate arm lies within a longitudinal recess on the tool body and an extended position.

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The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as mechanical vulnerability of the construction of the biasing means.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The biasing means as claimed is an elongate arm that is an extension of the cutting head. Actuating the biasing means moves the elongate arm from a retracted position where said elongate arm lies within a longitudinal recess in the tool body to an extended position. The construction as claimed is considered to be a mechanically more solid system (in the retracted position the elongate arm lies within a longitudinal recess in the tool body) compared to the construction as disclosed in D1 where also during inactivity the biasing means are relatively exposed at the open lower side of the tool.

A similar line of reasoning applies to independent apparatus claim 12.

Claims 2-11 and 13-21 are dependent on independent claims 1 and 12 and as such also meets the requirements of the PCT with respect to novelty and inventive step.

30.07.2004

(96)

CLAIMS

1. A method of cutting through a tubular of a wellbore at a selected location in the wellbore using a remotely controlled electrically powered cutting tool that comprises (a) a tool body, (b) a cutting head provided with a cutting means, the cutting head being pivotally mounted on the tool body at or near the lower end thereof, (c) an electrically actuatable means for pivoting the cutting head, and (d) a biasing means, the method comprising the steps of:

- passing the cutting tool to the selected location in the wellbore with the longitudinal axis of the cutting head aligned with the longitudinal axis of the tool body;
- electrically actuating the pivoting means to pivot the cutting head with respect to the tool body to a position where the cutting means of the cutting head is adjacent the wall of the tubular;
- actuating the biasing means to urge the cutting means of the cutting head against the wall of the tubular, and
- actuating the cutting means to cut through the tubular of the wellbore.

characterized in that the biasing means is an elongate arm that is an extension of the cutting head, said arm being moveable between a retracted position where said elongate arm lies within a longitudinal recess in the tool body and an extended position.

2. A method as claimed in Claim 1 wherein the tool body is provided with a transversely extending fulcrum which pivotally supports the cutting head and the pivoting means pivots the cutting head about the transversely extending fulcrum to a position where the cutting means of the cutting head is adjacent the wall of the tubular.

3. A method as claimed in Claims 1 or 2 wherein the tubular is a hydrocarbon fluid production tubing, a casing or a liner of a wellbore.

4. A method as claimed in any one of the preceding claims wherein the cutting tool is passed to the selected location in the wellbore through the production tubing.

5. A method as claimed in any one of the preceding claims wherein the cutting tool is passed to the selected location in the wellbore with the elongate arm in its retracted position and actuation of the means for pivoting the cutting head causes the elongate arm to pivot outwardly

with respect to the tool body to its extended position to engage the wall of the tubular at a position opposite to the cutting means.

6. A method as claimed in any one of the preceding claims wherein the elongate arm is provided with traction means at the location where the arm engages the wall of the tubular.

7. A method as claimed in any one of the preceding claims wherein the cutting head is a rotatable mill head provided with a mill cutter and the method further comprises the step of rotating the mill head so that the mill cutter cuts through the tubular.

8. A method as claimed in any one of the preceding claims wherein the cutting tool is passed to the selected location in the wellbore suspended from a cable, coiled tubing, or an electric drill string via a releasable connector.

9. A method as claimed in any one of the preceding claims wherein the cutting tool further comprises an anchoring means and the tool is locked in place at the selected location in the wellbore by setting the anchoring means prior to actuating the pivoting means.

10. A method as claimed in Claim 9 wherein the tool further comprises a stepper motor located below the anchoring means and after setting the anchoring means, the stepper motor is operated to rotate the tool body about its longitudinal axis while the cable, coiled tubing or electric drill string remains stationary thereby allowing the cutting head to be orientated in the wellbore prior to actuating the pivoting means.

11. A method as claimed in any one of the preceding claims wherein the cutting tool further comprises a traction means for moving the cutting tool in a longitudinal direction through the wellbore and the method further comprises the step of actuating the traction means to longitudinally extend the cut that is made through the tubular.

12. A remotely controlled electrically powered cutting tool for cutting through a tubular at a selected location in a wellbore, the tool comprising (a) a tool body, (b) a cutting head provided with a cutting means, the cutting head being pivotally mounted on the tool body at or near the lower end thereof, (c) an electrically actuatable means for pivoting the cutting head, and (d) a

biasing means to urge the cutting means of the cutting head against the wall of the tubular, characterized in that the biasing means is an elongate arm that is an extension of the cutting head, said arm being moveable between a retracted position where said elongate arm lies within a longitudinal recess in the tool body and an extended position.

13. A tool as claimed in Claim 12 wherein the cutting tool is provided with a transversely extending fulcrum on which the cutting head is pivotally mounted.

14. A tool as claimed in any one of Claims 12 or 13 wherein the tool body is provided with a releasable connector for a cable, coiled tubing or electric drill string.

15. A tool as claimed in any one of Claims 12 to 14 wherein the cutting tool is provided with an anchoring means for locking the tool in place in a wellbore.

16. A tool as claimed in Claim 15 wherein an electrically operated stepper motor is located at or near the upper end of the tool body at a position below the anchoring means.

17. A tool as claimed in any one of Claims 12 to 16 wherein the tool further comprises a traction means for moving the tool in a longitudinal direction through a wellbore.

18. A tool as claimed in Claim 17 wherein the traction means comprises (a) a connector for the cable, coiled tubing or electric drill string having at least one telescopic part comprising a section of tube that is capable of sliding into another section of tube and (b) independently operatable upper and a lower anchoring means arranged on the connector above and below the telescopic part respectively.

19. A tool as claimed in Claim 18 wherein the upper and lower anchoring means each comprise a set of radially extendible rams.

20. A tool as claimed in any one of Claims 12 to 19 wherein a guide means having a radially extendible gripping member is releasably suspended from the tool.

21. A tool as claimed in any one of Claims 12 to 20 wherein a remotely-controlled electrically powered motor is located within the tool body for rotating the cutting head.